control block diagram in the first embodiment of the present invention.

Please amend page 15, line 25 - page 16, line 8, to read as follows:

The backlight device 201 is applied therewith a power from a backlight power source 205 and is adapted to illuminate the real image display part 202, and accordingly, it is preferable to uniformly illuminate the real image display part 202 in its entirety with brightness higher than a predetermined value. As to the power source for such a backlight device, there may be preferably used a light emitting device using light emitting diodes (LED), electroluminescence (EL), thin flourescent lamps or the like, since it can offer high and uniform bright illumination.

Please amend page 16, line 24 - page 17, line 19, to read as follows:

It is noted that the degree of resolution of the real image display part 202 is higher than at least 320 X 480, and preferably higher than 800 X 600 in order to satisfy the display

capacity required for the portable data terminal, thereby it is possible to substantially eliminate erroneous recognition of an electronic male, image data or the like. By setting the size of the real image display part 202 to be smaller than at least 1 inch, and preferably smaller than 0.5 inch, the virtual image display apparatus 100 incorporated in the portable data terminal can be small-sized, thereby it is possible to display an apparently large image with high definition. Thus, the virtual image display apparatus 100 can be simply incorporated in an electronic equipment such as a portable data terminal while restraining the electronic equipment from being large-sized. Further, since the enlarged virtual image apparently has a size which is larger than 24 inch, and preferably larger than 28 inch at a position in front of the virtual image display apparatus 100 by a distance of 2mm, thereby it is possible to provide a virtual image display apparatus which is excellent in visibility and which can prevent erroneous recognition or overlooking.

Please amend page 18, first full paragraph, to read as follows:

The backlight device 201 and the real image display part 202 are incorporated in a housing 203 which is in turn mounted to the housing 50 of the portable data terminal. This housing 203 is preferably made of a metal or resin material which is optically low transmissive, and which has a sufficient thickness and a high degree of hardness so that it can hardly transmit therethrough incident light. As to such a metal material, aluminum, magnesium, brass or the like, and as well metal and alloy having a high strength and a high degree of hardness corresponding to these materials. Alternatively, ABS polystyrol or synthetic resin having a high strength and a high degree of hardness substantially equal to those of the former materials may be used. In particular, with the use of the above-mentioned metal or alloy, the heat generated in the image forming module 200 can be efficiently transmitted and radiated, thereby it is possible to restrain overheat of the image forming module 200. Further, with the use of the resin material, it is possible to aim at reducing the weight of the virtual image display apparatus 100 so as to optimize a portable electronic equipment such as a portable data terminal which is commercially required to be small-sized.

Please amend page 19, first full paragraph, to read as follows:

It is preferable to provide such a configuration that the space between the backlight device 201 and the real image display part 200 incorporated in the housing 203 is surrounded by the housing 203 so as to cause light emitted from the backlight source to enter the real image part 200 by a substantially all part thereof since the stray light can be restrained from emitting from the backlight device 201.

Please amend page 20, first full paragraph, to read as follows:

It is noted that a self-emission type display device which does not require the backlight device 201 may be used as the real image display part 202 although liquid crystal is used as the real image display part 202 in this embodiment. As to such a self-emission type display device, there may be used an organic EL, an LED panel, a field emission display device and the like. With the use of these display device, the necessity of the back-like device 201 can be eliminated, and the structure of the image forming module 200 can be simplified while uniform brightness

distribution having a high degree of brightness can be obtained, thereby it is possible to reduce both heat radiation and power consumption. Further, thereby it is possible to aim at reducing the size and the thickness of the portable data terminal.

Please amend page 20, second full paragraph, to read as follows:

Further, although Fig. 4 shows, for the sake of convenience, the image processing circuit 204 and the backlight power source 205 which are both provided outside of the housing 50, both image processing apparatus 204 and the backlight power source 205 should be actually accommodated in the housing 50 or the housing 203.

Please amend page 22, line 18 - page 23, line 18, to read as follows:

The bundle of right rays emitted from the image forming module 200 and having image data, after entering the inside of the light guide member 300 from the incident part 301a of the first surface 301 of the light guide member 300, is incident by its substantial part thereof upon the first internal reflection

surface 302 so as to be reflected thereby. Further, the bundle of light rays reflected thereby is reflected by a reflecting part 301b which is present in the same plane as that of the incident part 301a and which is substantially planar. Since the reflection upon the reflecting part 301b is a total reference ruled by the Snell's Law, no film coating such as a metal or dielectric multilayer film as mentioned above which enhances the reflectance is required, and further, no process for attaining the object of enhancing the reflectance is required. With this arrangement which does not require the formation of a reflecting film on the reflecting part 301b, since the light from the first internal surface can be reflected without substantially decreasing the quantity of the light entering the light guide member 300 from the image forming module 200, and the quantity of the light emanating the light guide member 300 and entering into the light condensing member 400, the efficiency of the use of light can be enhanced, and since the quantity of light emitted from the backlight device 201 can be restrained from increasing, the power consumption of the image forming module 200 can be lowered.

Please amend page 26, line 14 - page 27, line 6, to read as follows:

Next, explanation will be made of the positional relationship between the image forming module 200 and the light guide member 300. It is configured that the angle between the real image display part 200 of the image forming module 200 and the incident part 301a of light guide member 300 is smaller than 10 deg., or preferably, they are substantially in parallel with each other. With this configuration, the center axis of light emanating from the real image display part 202 makes an angle of 80 deg. or is preferably and substantially perpendicular to the incident part 301a, and accordingly, light which is emitted from the image creating part 202 and which is incident upon the incident part 301a is not substantially reflected by the surface of the incident part 301a so that the light from the real image display part 202 can be introduced by a substantial part thereof into the light guide member 300. Thus, the efficiency of the use of light is high, thereby it is possible to restrain power consumption for ensuring the light quantity, from being increased.

Please amend page 29, last line - page 30, line 12, to read as follows:

Further, such an configuration that the length of the locus of light which is emitted from the center of the real image display part 202 of the image forming module 200 and reaches the eye point 404 (that is, the optical path length) is set to be greater than three times as larger as the thickness D of the light guide member 300, can satisfy the optical characteristic of the light guide member 300. Because the optical path length can be made to be longer while the thickness D of the light guide member 300 which is a main factor for determining the size of an electronic apparatus is decreased. Thus, aberration can hardly occur in the light condensing means.

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Please amend page 32, first full paragraph, to read as follows:

By peeping into the display window 106 from the position of a viewing eye relief, an entire pattern (a, b, c, d ...t) broadly displayed on the real image display part 202 over its whole display area can be projected into a visually magnified virtual image. Accordingly, a substantially all part of the image

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displayed on the real image display part 202 can be seen as a greatly magnified virtual image, and further, it is possible to prevent someone else nearby from glancing the image while the enlarge image is observed. It is noted that Figs. 6a and 6b schematically show a magnified virtual image and a real image displayed on the real image part 202, and accordingly, the relationship between the sizes of the images should not be directly limited to that as shown in Figs. 6a and 6b.

Please amend page 33, lines 12-28, to read as follows:

The reason why the display area is limited as mentioned above, is that the viewing angle is limited by the viewing frame of the light condensing member 400, and accordingly, an apparent display area becomes smaller. Actually, a display pattern (ghilmn) in the center part of the display area of the real image display part 202 is magnified and virtually displayed in the display window 106 (viewing plane), and accordingly, the observer can see a zone exhibiting the display pattern g, h, l, m, n. It is noted that the characters (or a magnification factor of an image) can be arbitrarily selected in accordance with a vision or a use condition since the size of a character on display can

become larger in comparison with the short eye relief. Thereby it is possible to provide a virtual image display apparatus having a visibility which is satisfactory and which is convenient in use.

Please amend page 37, line 25 - page 38, line 6, to read as follows:

It is noted that the light condensing member 400 is set to be stationary so as to be unmovable in this embodiment, and accordingly, it is configured that the short eye relief is always set in a normal condition. Further, by peeping into the display window 106 from the position of a predetermined short relief, the whole pattern (abcd ... rst) displayed broadly on the real image display part 202 over its entire display area can be projected in the form of a visually magnified virtual image.

Please amend page 39, second full paragraph, to read as follows:

It is noted the correction member 406 is provided between the light condensing member 400 and the real image display part

202, it may be provided at any position if it is located between the real image display part 202 and the eye.

Please amend page 40, line 21 - page 41, line 7, to read as follows:

Referring to Fig. 9a which shows a use condition in the case of the short eye relief, by causing the image forming module 200 or the real image display part 202 to approach the light condensing member 400, an image displayed on the real image display part 202 is magnified by the light condensing member 400 into a virtual image and accordingly, the whole displayed image on the real image display part 202 can be projected. In this phase, the optical systems is configured in such a way that an image can be observed with the distance between the topmost part 400a of light condensing member 400 and the outer surface of the eye of the observer, that is, the eye relief being held to be relatively short so as to be in a range form 10 to 30 mm.

Please amend page 41, line 26 - page 42, line 10, to read as follows:

It is noted that slight shift of the real image display part 202 away from the light condensing member 400 (away from the observer) is equivalent to such a case that the real image display part 202 is shifted away from the light guide member 300 in an example using the light guide member 300 as shown in the first embodiment. Further, slight shift of the real image display part 202 toward the light condensing member 400 (toward the observer) is equivalent to such a case that the real image display part 202 approaches the light guide member 300 in an example using the light guide member 300 as shown in the first embodiment.

Please amend page 49, first full paragraph, to read as follows:

Further, in the stray light incident parts 302b, 303b, surfaces 302d, 303d which abut on support parts 51, 52 for supporting the light guide member 300 are preferably formed thereon with light absorbing films, similar to the light absorbing films 302c, 303c, for preventing the stray light components from being reflected so as to restrain occurrence of stray light components. Further, in addition to the light guide

member 300, light absorbing films may be formed on contact surfaces 51a, 52a o the support parts 51, 52, making contact with the light guide member 300, or the support parts 51, 52 may be made of bakelite, a black material containing carbon, a black material kneaded therein with black paint or the like. Thus, light incident upon the surfaces 302d, 303d can be sufficiently absorbed, thereby it is possible to restrain occurrence of stray light components.

Please amend page 50, first full paragraph, to read as follows:

An end surface 403a of the housing 403 on the display window 106 side is provided, being preferably adjacent to a surface 50a of the housing 50 since the stray light leaking from a space between the housing 50 of the portable data terminal and the housing 50 of the light condensing member 400 can be minimized. Specifically, the distance between the end surface 403a and the surface 50a is set to be less than 15 mm in order to effectively restrain the stray light from leaking.

Please amend page 50, line 13 - page 51, line 6, to read as follows:

Further, the image forming module 200 and the light guide member 300 are covered thereover with a light shield member 500 so as to block the stray light leaking from the image forming module 200 and the light guide member 300, thereby it is possible to restrain the stray light from entering the light condensing member 400 and the display window 106. The light shield member 500 preferably cover at least the entire first surface 301 of the light guide member 300, and more preferably, covers not only the outer surface of the first internal reflecting surface 302 and the outer surface of the second internal reflecting surface 303 but also the side surfaces thereof. With this arrangement, not only the stray light generated from the image forming module 200 but also the stray light leaking from the light guide member 300 can be substantially blocked., Thus, it is possible to prevent the stray light entering the light condensing member 400 and the display window 106, and thereby, it is possible to restrain deterioration of the optical characteristics caused by entrance of the stray light. Thus, the visibility can be enhanced.

Please amend page 55, line 20 - page 56, line 5, to read as follows:

Further, the side of an image which can be seen by the user, greatly depends upon an viewing angle for observation, and this viewing angle for observation greatly depends, in turn, upon the diameter of a light beam incident upon the light condensing member 400. This beam diameter depends upon divergence of the light from the image forming module 200, which is caused by the light guide member 300, but if the viewing angle becomes excessively large, there would be caused such condition that the terms of the total reflection cannot be held in the reflecting part 301b at the peripheral part of an image to be observed, (as to a light beam exceeding θ1 or θ3). Thus, stray light would possibly occur.

Please amend page 56, first full paragraph, to read as follows:

In consideration with the terms for the configuration of an optical system for radically remove this stray light, higher than 95 % of the total quantity of light (θ1 to θ3) should be exceed an incident angle of 40 deg. or preferably exceeds an incident

angle of 45 deg. Further, as to a light beam exceeding the critical angle (a light beam having an incident angle of less than 40 deg, for example, a light beam exceeding θ3), any of the image forming module 200, the light shielding member 206, the light shielding member 500 and the housing 403 is arranged in the propagating direction of the light beam in order to block the stray light. With this arrangement, even the stray light leaking from the light guide member 300 is not substantially incident upon the display window 106 or the lenses 401, 402 of the light condensing member 400, and it is possible to prevent the visibility of the virtual image display apparatus from being lowered due to the stray light.

Please amend page 58, line 4 - page 59, line 10, to read as follows:

Next, explanation will be made of another structure of the light guide member 300. Figs. 17 is a view illustrating the arrangement of a display device in another embodiment of the present invention, and Fig. 18 is an enlarge view illustrating an essential part shown in Fig. 17. Referring to Figs. 17 and 18, explanation will be made of another optical system according to

the present invention, and peripheral parts therearound. A backlight device 201 serves as a light source required for projection when it is fed thereto with a power from a backlight power source 205. A real image display part 205 for reproducing an image from an image data signal transmitted from an external image forming module 200 produces an image. These basic structures are the same as that of the embodiments mentioned above. The feature of this embodiment is such that an optical prism 315 in a quadrate columnar shape having a substantially parallelogram section is used, instead of the light guide member 300. The optical prism 315 according to this embodiment of the present invention can be advantageously used in the case of ensuring a predetermine distance between the real image display part 202 and the display window 106 (prolonging the distance). Diffused light emitted from the backlight device 201 passes through the real image display part 202 so as to form a bundle of light rays containing image data. This bundle of light rays at first incident upon the optical prism 315. The incident position is one of side surfaces of the optical prism 315, and in a part of an incident surface (the second internal reflecting surface) 316. The incident surface (the second internal reflecting

surface) 316 is exhibited as a part since it has a plurality of functions similar to the first surface 301 shown in Fig. 4, as mentioned above.

Please amend page 59, line 18 - page 60, line 5, to read as follows:

A bundle of light rays which is further reflected is reflected at a second internal reflecting surface 316 which is substantially planar, which is one and the same plane as that of the incident surface 315. The reflection at the second internal reflecting surface 316 becomes total reflection ruled by the Snell's Law. Accordingly, no film coating made of metal or a dielectric multi-layer film, as mentioned above, for enhancing the reflectance rate is in particular required, and further, no special process for attaining the object of enhancing the reflectance rate is applied. Further, the bundle of light rays reflected at the second internal reflecting surface 316 reaches a third internal reflecting surface 318 having the same function as that of the second internal reflecting surface 316 as mentioned before.

Please amend page 60, first full paragraph, as follows:

Further, the bundle of light rays, after being reflected at the third internal reflecting surface 318 through the total reflection, reaches a fourth internal reflecting surface 319 which has the same function as that of the first internal reflecting surface 317 as mentioned before, and accordingly, reflects a part of the light rays but transmits therethrough the remainder of the light rays. The reflected light rays emanates outside from a light emanating surface 318 which is the same plane as that of the third internal reflecting surface 318. That is, the bundle of light rays repeats the internal reflection by four times within the optical prism 315. The bundle of emanating light rays is led through the light condensing member 400 located just after the light guide member 300 and having a positive refractive power so as to be projected in the form of a magnified virtual image which is obtained by visually magnifying an image displayed on the real image display part 202, in the viewing field (the position of the eye point corresponds to a position 404 in the figure).

Please amend page 61, first full paragraph, to read as follows:

Further, a liquid crystal or mechanical shutter mechanism (which is not shown) is located at the first internal reflecting surface 317 or at a position extremely near thereto, and accordingly, stray light generated during observation of a virtual image can be eliminated. Further, a correction prism 322 having a substantially triangular columnar shape and making contact with the first internal reflecting surface 317 is provided, and accordingly, a display image can be observed in front without being curved. An emanating surface 323 of the correction prism 322 is substantially parallel with the incident surface 316.

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Please amend page 62, first full paragraph, to read as follows:

Further, an external light introducing prism 324 is mounted on the fourth internal reflecting surface 319 of the optical prism 315 through the intermediary of the half mirror part (319). This external light introducing prism 324 is mounted so as to be joined to the optical prism 315 (with no gap therebetween). This

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external light introducing prism 324 is formed in a triangular columnar shape having side surfaces one of which is a planar surface in parallel with the light emanating surface 318. The planar surface parallel with the emanating surface 318 is formed therein with a recessed part 325. Light rays introduced from an external light introducing window 326 are introduced into the viewing field of the observer while the angle of the line of sight in the observing direction is held so as to cancel out the refractive power of the light condensing member 400.

Please amend page 63, last line - page 64, line 11, to read as follows:

Next, explanation will be made of the structure and operation of the shutter part 327 using liquid crystal and mounted just before the external light introducing window 326 as shown in Fig. 18. The shutter part 327 is simply adapted for controlling the quantity of transmitting light, and accordingly, the shutter part 327 is closed in response to instructions from a control processor part 328 so as to completely shut off light from the outside. Thus, only light from a small-sized display

module 14 is projected. With this arrangement, the observer can concentrate to an image form the small-sized display module 14.

Please amend page 64, first full paragraph, to read as follows:

In response to instructions from the control processor part 328, the display of the real image display part 202 os disappeared, and the shutter part 327 is opened so as to introduce light form the outside into the eyes in order to plainly show the situation of surroundings, Should the display of the real image display part 202 to be turned on in addition to the opening of the shutter part 327, two images would be introduced being overlapped with each other so as to cause invisibility. Accordingly, overlapping display is prevented in this mechanism. Further, as mentioned above, not only the liquid crystal shutter mechanism but also a mechanical shutter mechanism may be used for effecting the identical function.

Please amend page 65, line 14 - page 66, line 9, to read as follows:

Referring to Fig. 19 which is a schematic view illustrating a display device in an eighth embodiment of the present invention, similar to the above-mentioned seventh embodiment, except such a feature that a new lens is added in the optical prism 315, in comparison with the above-mentioned embodiment 7, explanation will be made or an optical system and peripheral units thereof. Diffusion light emitted from the backlight device 201 passes through the real image display part 202 so as to create a bundle of light rays containing image data. The bundle of light rays is incident upon the first optical prism 329 through a part of the incident surface 330. The first optical prism 329 is formed in a triangular columnar shape having a substantially right-triangular section. A planar surface along a longer one fo two sides making a right angle therebetween, is a first internal reflecting surface 331 formed of a half mirror part made of metal or a dielectric multi-layer film as mentioned above. The bundle of light rays is reflected at the first internal reflecting surface 331 while the remainder of light rays is emanated outside of the first optical prism 329, and accordingly, a display image is directly projected into the viewing field, as mentioned above.

Please amend page 68, second full paragraph, to read as follows:

Further, a liquid crystal or mechanical shutter (which is not shown, and refer to the shutter part 327 shown in Fig. 18) is provided at or in close vicinity to the first internal reflecting surface 331 so as to eliminate stray light caused during observation of a virtual image. Further, a correction prism 339 having a triangular columnar shape is provided, making contact with the first internal reflecting surface 331, and accordingly, a display image can be observed in front without being curved. The emanating surface 340 of the correction prism 339 is substantially parallel with the incident surface 330. The structure of this arrangement is similar to that of any of the above-mentioned embodiments.

Please amend page 72, first full paragraph, to read as follows:

In particular, since the user directly peeps into the virtual image display apparatus or the portable data terminal, it is likely to make his face into contact with the housing 50. Different from the hands which are custom to bring hot things,

the face is very sensitive to heat, and accordingly, the user feels uncomfortability even though the temperature of the housing is not so high so that the user can touch the housing by his hand. Further, the user would possibly astonished at such a moment that his face touches a hot part of the housing 50. In view of these points, it is desirable to lower the temperature of the surface of the housing 106 around at least the display window 50 to a degree with which the user does not feel hot heat. Specifically, it is preferably set to a value which is below 40 deg.C, and is more preferably set to a value lower than about 35 deg.C which is lower than the human temperature.

Please amend page 72, line 26 - page 73, line 12, to read as follows:

With the arrangement shown in this embodiment, it is possible to minimize the temperature of the surface of the housing 50, even though the face or hands of the user touches the housing 50, and the user can restrain from feeling uncomfortability, and can be prevented from being astonished by hot heat. Further, radiation of heat to the eye point 404 can be minimized. Thereby it is possible to provide a portable data

terminal which can carry out a comfortable work, and which is convenient in use. Further, with the provision of the heat shielding member 226 to the image forming module 200, transmission of heat to members other than the image forming module 200, provided in the portable data terminal, and the volume of heat radiation can be greatly reduced.

Please amend page 77, line 16 - page 78, line 1, to read as follows:

This embodiment is similar to the above-mentioned ninth embodiment in view of such a fact that the heat shielding member 226 is provided outside of the housing 203 which holds the backlight device 201 incorporated in the image forming module 200 and the real image display part 202, so as to cover the housing 203. However, a hole part 226a which is communicated with the outside is formed in a part of a side surface of the heat shielding member 226, and a heat radiating panel 228 is made into contact with or is located adjacent to the backlight device 201 while preventing the real image display part 202 from being shielded. Further, a part of the heat radiating panel 228 is projected from the hole part 226a.

Please amend page 78, last line - page 79, line 13, as follows:

Further, referring to Fig. 25 which is a partly sectioned view illustrating a portable data terminal incorporating a virtual image display apparatus in another embodiment of the present invention, a heat sink part 229 for temporarily reserving radiation heat before heat radiation outside of the apparatus is provided between the image forming module 200 and the heat shielding member 226, and further, heat radiation fins 230 are formed in a side part of the heat sink part 229 so as to prevent the backlight device 201 and the real image display part 202 from being shielded. The heat sink part 229 and the heat radiation fins 230 are communicated with each other through the hole part 226a as mentioned above.

Please amend page 83, second full paragraph, to read as follows:

Further, the air around the image forming module 200, heated by the image forming module 200 is discharged outside from the portable data terminal through the slit 50c due to the rotation of the cooling fan 235. It is preferable to form an opening in

addition to the slit 50c, in the housing 50 of the portable data terminal in order to enhance the discharge efficiency of warmed air by the cooling fan 235. Further, a slit 50e serving as the opening is more preferably formed in a surface 50d opposite to the surface 50b of the housing 50.

Please amend page 84, first full paragraph, to read as follows:

Thus, in the virtual image display apparatus or the portable data terminal in which the display window 106 and the image forming module 200 are arranged being adjacent to each other, the slit 50e is formed in the housing 50 at a position which is nearer to the display window 106 than to the image forming module 200 while the cooling fan 235 is arranged at a position which is nearer to the image forming module serving as a heat source than to the display window 106, and a slit 50c is formed near to the cooling fan 235 so as to create air flow from the cooling fan 235 to the slit 50c while causing air to flow from the slit 50e to the slit 50c. Thus, the air heated by the image forming module 200 is retrained from being directed to the display window 106, thereby it is possible to restrain the air heated by the image

forming module 200, from impinging upon the user who peeps into the virtual image display apparatus from the display window 106. Thus, it is possible to provide a portable data terminal which can substantially prevent the user from feeling uncomfortability and which is convenient in use.